

WHAT IS CLAIMED IS:

1. A picture recognition apparatus, comprising:  
an object modeling execution part for estimating variations in  
5 appearance of an object caused by variations in a capturing environment and  
modeling the object;  
an object model registering part for previously registering the object  
model obtained in the object modeling execution part in a database;  
a picture information input part for inputting picture information of  
10 an object to be a recognition target;  
a similarity determining part for matching the input picture  
information with the object model previously registered in the object model  
registering part, and determining a similarity with respect to the registered  
object model; and  
15 an object recognizing part for outputting a type of the object to be a  
recognition target determined to be most similar among the registered object  
model,  
wherein, in the object modeling execution part, information of a  
plurality of pictures captured by changing a relative position and posture of  
20 the object with respect to the fixed picture information input part is input, and  
variations in appearance of the object caused by possible variations in a  
capturing environment are estimated to be modeled based on the input  
information of a plurality of pictures.
- 25 2. A picture recognition apparatus according to claim 1, wherein a Lambertian  
reflection model is assumed as surface characteristics of the object to be a  
recognition target.
- 30 3. A picture recognition apparatus according to claim 1, wherein, in the  
picture information input part, a portion including the object to be a  
recognition target is cut out from a picture, and the object to be a recognition  
target is modeled using the cut out portion.

4. A picture recognition apparatus according to claim 1, wherein, in the picture information input part, a characteristic small region in the object to be a recognition target is selected from a picture, and the object to be a  
5 recognition target is modeled based on information included in the selected small region and arrangement information of the small region.
5. A picture recognition apparatus according to claim 1, wherein, in the object modeling execution part, variations in appearance caused by variations in a  
10 posture of the object and variations in appearance caused by variations in illumination conditions are separately modeled based on the input picture information.
- 15 6. A picture recognition apparatus according to claim 2, wherein, in the object modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are separately modeled based on the input picture information.
- 20 7. A picture recognition apparatus according to claim 3, wherein, in the object modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are separately modeled based on the input picture information.
- 25 8. A picture recognition apparatus according to claim 4, wherein, in the object modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are separately modeled based on the input picture  
30 information.
9. A picture recognition apparatus according to claim 1, wherein, in the object

modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are modeled together based on the input picture information.

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10. A picture recognition apparatus according to claim 2, wherein, in the object modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are modeled together based on the input picture information.

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11. A picture recognition apparatus according to claim 3, wherein, in the object modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are modeled together based on the input picture information.

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12. A picture recognition apparatus according to claim 4, wherein, in the object modeling execution part, variations in appearance caused by variations in a posture of the object and variations in appearance caused by variations in illumination conditions are modeled together based on the input picture information.

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13. A picture recognition method, comprising:

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estimating variations in appearance caused by variations in a capturing environment and modeling the object;

previously registering the obtained object model in a database;

inputting picture information of an object to be a recognition target;

matching the input picture information with the previously registered

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object model to determine a similarity with respect to the registered object model; and

outputting a type of the object to be a recognition target determined to

be most similar among the registered object models,

wherein information of a plurality of pictures captured by changing a relative position and posture of the object is input, and variations in appearance of the object caused by possible variations in a capturing environment are estimated to be modeled based on the input information of a plurality of pictures.

14. A computer-readable recording medium storing a program to be executed by a computer, the program comprising:

10 estimating variations in appearance caused by variations in a capturing environment and modeling the object;

previously registering the obtained object model in a database;

inputting picture information of an object to be a recognition target;

15 matching the input picture information with the previously registered object model to determine a similarity with respect to the registered object model; and

outputting a type of the object to be a recognition target determined to be most similar among the registered object models,

20 wherein information of a plurality of pictures captured by changing a relative position and posture of the object is input, and variations in appearance of the object caused by possible variations in a capturing environment are estimated to be modeled based on the input information of a plurality of pictures.